2002 Report to the Legislature

Status of High and Significant Hazard Dams in Washington with Safety Deficiencies

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Status of High and Significant Hazard Dams in Washington with Safety Deficiencies

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Executive Summary

This report updates information regarding the condition of 310 dams in Washington that are situated above populated areas and regulated by the Department of Ecology's Dam Safety Office. The report also updates the progress to repair or improve dams found to be deficient during previous periodic safety inspections. The Executive Summary Figure on page 2 illustrates the numbers and status of dams in Washington.

The following three key messages summarize the status of dam safety in Washington in 2002:

- For the first time in many years, more projects (8) were added to the list of dams with deficiencies than were removed by being repaired (5). Fewer dams were repaired because funding is not readily available to the owners. In addition, more dams are being added to the deficiency list due to population growth, increasing seismic standards, aging of man-made materials and lack of maintenance.

- Total repair costs for the 30 dams listed as having safety deficiencies is estimated to be more than $1 million. Unless state or federal funding becomes available for repairing and maintaining existing infrastructure, many owners will not be able to afford repairs and the gap between dams with deficiencies and those that have been repaired will continue to widen. Until such funding can be secured, Ecology will continue to prioritize its efforts toward ensuring that unsafe dams which have the greatest number of downstream lives at risk are repaired. The department will work closely with owners to find innovative ways to reduce the cost of making these necessary repairs.

- With the current dam safety staffing, it is anticipated that *high hazard* dam inspections will barely keep up with a 6-year cycle, while inspections on *significant hazard* dams will lag further behind at an 8-year cycle. Both inspection cycles are much longer than the 3-5 year cycle recommended in federal dam safety standards. However, the 2003-05 biennial budget submitted by Gov. Locke proposed additional staffing in FY 2005. This is contingent, however, on the ability to increase fees to help us achieve a 5-year inspection cycle for all high-risk dams.

In 2001-2002, Ecology completed or oversaw:

290 emergency inspections following the Feb. 28, 2001, Nisqually Earthquake
32 reconnaissance inspections
24 periodic dam inspections and detailed engineering analyses
5 safety deficiencies corrected by dam owners

Progress to correct deficiencies on dams slowed in 2001-2002 because the number of projects needing remedial work actually increased to 31. To date, safety deficiencies have been identified on 165 dams and actions to correct deficiencies include:

Deficiencies at 134 dams have been corrected
Partial repairs at 5 dams have been completed

High hazard dams — located upstream of three or more residences: The periodic inspection program utilizes a prioritization scheme that targets larger dams where greater numbers of people could be at risk in the event of a failure. All of the 122 high hazard dams have previously been inspected and are supposed to be on a 6-year inspection cycle. However, a continued heavy workload, new project review and construction inspections, coupled with the workload resulting from the 2001 Nisqually Earthquake resulted in fewer inspections completed than necessary to meet the 6-year inspection cycle.

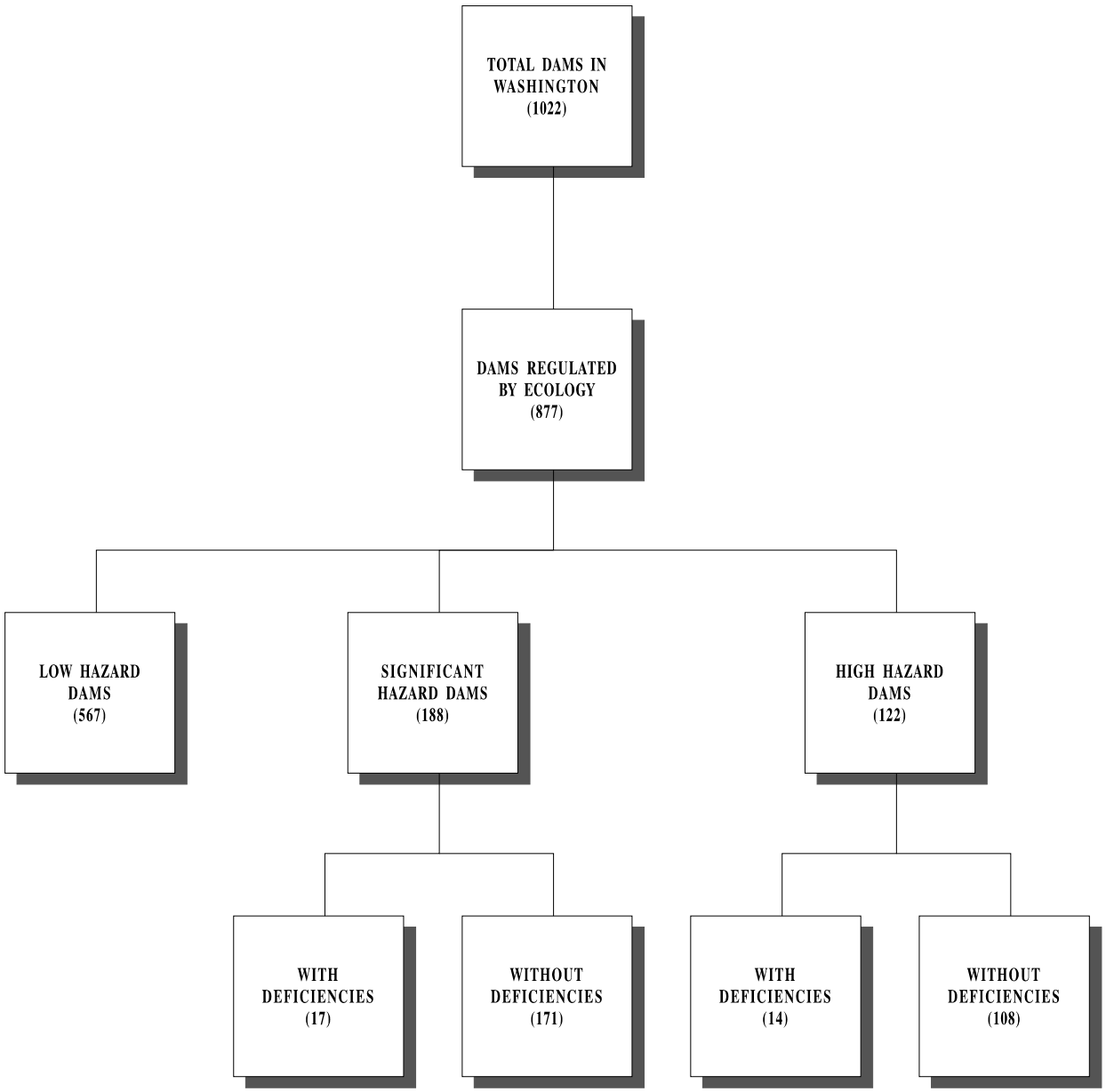
Significant hazard dams – located upstream of one or two homes: There are 188 significant hazard dams. These projects are supposed to be on an 8-year inspection cycle, but the heavy plan review workload and earthquake have pushed the inspection cycle to 10 years.

Risk factors: It should be noted that our inspection cycles are much longer than the 3-5 year cycle recommended by federal dam safety guidelines. The decrease in frequency of inspections means that aging, deterioration and

maintenance problems will have more time to develop between inspections, possibly threatening the safety of dams and placing citizens living downstream at greater risk. Also, new development occurring downstream from these dams will increase the number of citizens at risk from dam failure.

Future inspection cycles: In 2001 and 2002, Ecology received about $46,000 from the Federal Emergency Management Agency (FEMA). This funding provided about 50 percent of the cost of an entry-level engineer, who primarily worked on inspecting significant hazard dams. With the reauthorization of the Federal Dam Safety and Security Act of 2002, it is anticipated Ecology will receive approximately $70,000 a year over the next four years. The funding boost will allow the state Dam Safety Office to continue to employ this engineer position and allow the department to work toward reducing the inspection cycle. In addition, Gov. Locke's 2003-05 budget proposes an additional staff person beginning in FY 2005, depending on whether or not fees can be increased for plan reviews and new inspection fees put in place. If both measures are implemented, Ecology ought to be able to achieve a 5-year inspection cycle for dams with downstream populations at risk within a few years.

EXECUTIVE SUMMARY TABLE



Introduction

In accordance with RCW 90.54.160, the Washington Department of Ecology is directed to report to the Legislature regarding dam facilities that exhibit safety deficiencies that pose a threat to the safety of life and property. Under state law, the report also identifies dam owners, details about their ability and attitude toward correcting any deficiencies, and provides an estimate of the cost of correcting the deficiencies if a study has been completed. This information is contained in the tables in **Appendix A.** This is the sixteenth such report providing information on the current status of dams with *High and Significant* downstream hazard classifications that have safety deficiencies.

A dam is defined as any artificial barrier or any controlling works that impounds or has the ability to impound at least 10 acre-feet water. The downstream hazard classification refers to the potential effects a dam failure could have on people and property downstream from a dam and does not relate to the structural or operational condition of a dam. **Table 1** lists the classification system used by the Department of Ecology's Dam Safety Office (DSO).

Table 1
Downstream Hazard Classification

Downstream Hazard Potential	Downstream Hazard Class	Population at Risk	Economic Loss Generic Descriptions	Environmental Damages
Low	3	0	Minimal. No inhabited structures. Limited agriculture development.	No deleterious materials in water
Significant	2	1 to 6	Appreciable. 1 or 2 inhabited structures. Notable agriculture or work sites. Secondary highway and/or rail lines.	Limited water quality degradation from reservoir contents and only short-term consequences.
High	1C	7 to 30	Major. 3 to 10 inhabited structures. Low density suburban area with some industry and work sites. Primary highways and rail lines.	Severe water quality degradation potential from reservoir contents and long-term effects on aquatic and human life.
High	1B	31-300	Extreme. 11 to 100 inhabited structures. Medium density suburban or urban area with associated industry, property and transportation features.	
High	1A	More than 300	Extreme. More than 100 inhabited structures. Highly developed, densely populated suburban or urban area with associated industry, property, transportation and community lifeline features.	

Items of Note in 2001 and 2002

Progress continued in 2001 and 2002 to correct safety deficiencies and upgrade the safety of dams in Washington. In addition, due to a grant from FEMA under the National Dam Safety Program, the

department was able to hire a civil engineer which helped improve productivity and continued to increase the number of basic, or "reconnaissance" inspections over previous years. However, the number of dams repaired was still only able to keep pace with new projects found to be deficient through our periodic inspection program. Furthermore, our ability to maintain a 6-year cycle for detailed inspections of high hazard dams continued to slip, due to a continued heavy workload in plan reviews and construction inspections for new projects as well as overseeing needed repairs of existing dams. This trend is expected to continue during the next few years, unless additional engineering staff can be added through federal grants or state funding.

The following items are of particular note in 2001-2002:

- 5 dams with deficiencies were repaired or modified.

- 24 detailed inspections were conducted and eight dams were found to have safety deficiencies that could pose a threat to life or property. This figure actually represents only half the inspections needed to be done to meet the federal guideline for a minimum 6-year inspection cycle. This shortfall was due to the huge workload imposed following the Nisqually Earthquake on Feb. 28, 2001, and the need to complete the backlog of inspection report write-ups and analyses from previous years' inspections.

- 32 reconnaissance inspections were performed on the smaller dams where there is a moderate to low potential for loss of life in the event of a dam failure. Most of these inspections were performed by the engineer hired with FEMA funding through the National Dam Safety Program Act, PL104-303.

- 290 emergency inspections were performed by dam safety engineers following the 6.8 magnitude Nisqually Earthquake in February 2001. These inspections covered all of the dams located in the eight-county disaster area and were performed at the request of FEMA and the state Department of the Military Emergency Management Division. Fortunately, only five dams suffered damages as a result of the quake, and none of these projects presented a significant threat to public safety. The added workload from these inspections, however, did have an impact on the agency's workload, resulting in fewer periodic inspections completed.

- The Dam Safety Office underwent a "Peer Review" by the Association of State Dam Safety Officials (ASDSO) in February 2002. The objective of the ASDSO Peer Review program is to provide professional guidance to dam safety agencies to improve the management of their dam safety programs. The peer review evaluates the competence of the program relative to the generally accepted standards of practice of dam safety. The ASDSO review team concluded that Ecology's Dam Safety Office is meeting the minimum statutory and regulatory requirements of their program. However, they found that due to the increased workload imposed upon the agency, more full time staff were recommended to maintain the frequency of dam inspections. In order to maintain the program at its present level, and to meet national guidelines for dam inspections, they recommended that the DSO needs to re-evaluate its overall program, establish a strategic plan to prioritize workload and/or obtain additional staff, and take steps to implement the plan.

- On April 21, 2002, dam safety staff were contacted by the state Emergency Management Division to regarding the failure of the power canal at the Swift No. 2 project. This project consists of a 2,400-foot-long power canal downstream from the Swift Dam on the Lewis River, which is impounded behind an 83-foot-high earthen embankment at the lower end. Given the height of the embankment and the fact that the canal stores more than 2,000 acre-feet, this was essentially a dam failure. Since the dam is regulated by the Federal Energy Regulatory Commission (FERC), it is exempt from state dam safety regulations and Ecology's role was limited. However, the incident triggered the dam safety office's internal emergency procedures, including contacting appropriate federal, state and local agencies. On April 26, FERC invited the dam safety office to accompany them on an inspection of the failed dam. It appeared that the dam failed due to piping of embankment material into the lava foundation. Fortunately, there were no injuries at the dam, although a state highway was washed out.

Periodic Inspection

In general, periodic inspections and follow-up engineering analyses are performed on existing dams for various purposes including:

- Identifying obvious defects, especially due to aging.
- Evaluating project operation and maintenance.
- Assessing the structural integrity and stability of project elements.
- Determining the adequacy of the spillways to accommodate major floods.
- Assessing the stability of the structure under earthquake conditions.

Periodic inspections are the primary tool for detecting deficiencies at dams that could lead to failure. Experience has clearly shown that correction of these safety deficiencies in a timely manner can prevent dam failures and other serious incidents from occurring. The use of periodic inspections to detect deficiencies and avert disasters continues to be an important preventative tool in the dam safety program. Periodic inspections also help identify dams where significant development has occurred downstream, resulting in the need for more stringent design loadings due to greater population at risk.

Responsibility for Inspection of Dams in Washington

Responsibility for the inspection of the 1,022 dams in Washington rests with several agencies.

- Federally-owned and operated dams, such as facilities owned by the U.S. Army Corps of Engineers, Bureau of Reclamation, and various agencies of the Department of Interior are inspected by dam safety units within their respective agencies. (69 dams)

- Non-federal hydropower dams, licensed by the Federal Energy Regulatory Commission (FERC) are inspected by private engineering consultants every five years as required by the FERC as part of hydropower licensing. (76 dams)

- The remaining 877 dams are the sole responsibility of the Department of Ecology under

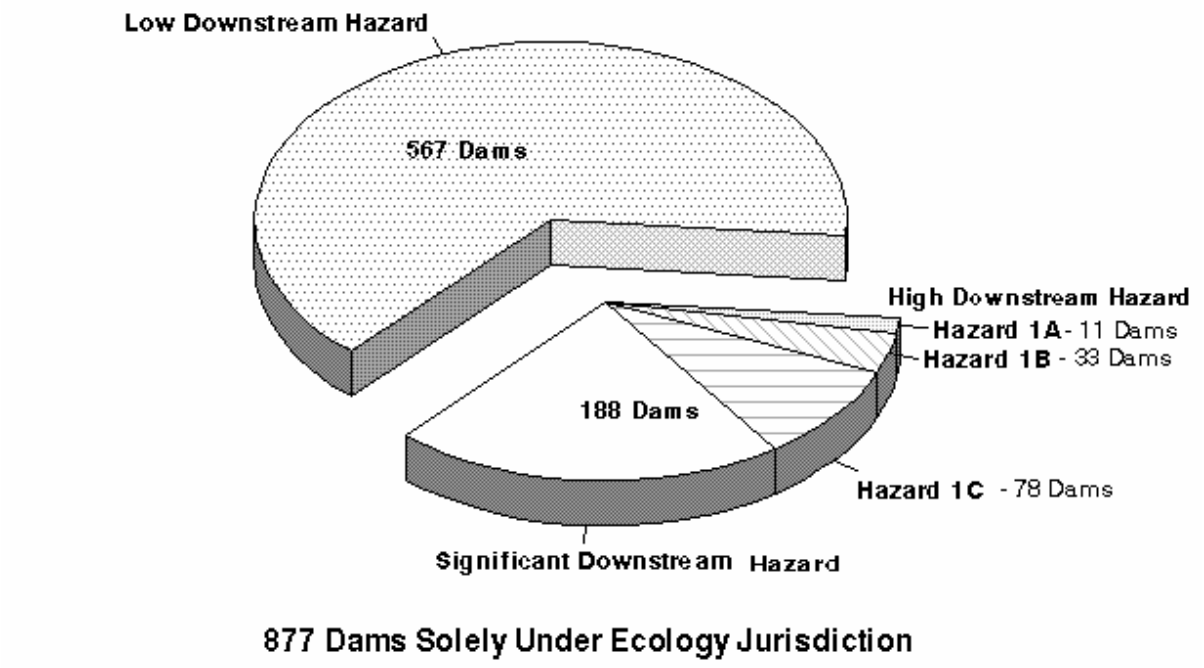
RCW 43.21A.064(2). These dams are inspected on a periodic basis by the Dam Safety Office.

Number of Dams Classified as High or Significant Downstream Hazard Potential

As stated above, there are currently 877 dams which are the sole regulatory responsibility of Ecology. A total of 310 of these dams are situated above populated areas and are classified as having *high* or *significant* downstream hazards if they were to fail. Priority is given to the periodic inspection of these dams.

The number of dams classified as high or significant hazard potential differs slightly from those reported in prior years. This variability in the number of dams occurs as new dams are built, or as existing dams are inspected and downstream hazard classifications are upgraded to reflect current development in the downstream valley. Also, the emergency inspection following the Nisqually Earthquake revealed that a few low hazard dams no longer existed. Of these 310 dams, about two-thirds are privately owned, and one-third publicly owned. The breakdown of dams by hazard classification is shown in Figure A.

Figure A
Number of Dams by Hazard Classification



Current Dam Safety Inspection Program

The Dam Safety Office utilizes a three-tiered approach in conducting periodic inspections. The three-tiered approach provides more efficient use of staff time for site inspections, conducting engineering analyses and preparing reports (Table 2). The basic concept is to allocate time and effort for engineering analyses and report preparation commensurate with the complexity of the project and the nature and severity of the suspected defects.

Table 2
Inspection Classifications

TYPE	PURPOSE	USAGE	DESCRIPTION
CLASS I	COMPREHENSIVE INSPECTION	First Periodic Inspection	Visual Inspection of all Project Elements; Detailed Engineering Analysis of Project Elements Under Extreme Flood and Earthquake; Prepare Comprehensive Report of Findings.
CLASS II	INTERMEDIATE LEVEL INSPECTION	Subsequent Periodic Inspections	Visual Inspection of all Project Elements; Some Engineering Analysis of Selected Elements; Prepare Summary Report of Findings.
CLASS III	RECONNAISSANCE INSPECTION	Preliminary or basic Inspection	Visual Inspection of Most Project Elements; Minimal Engineering Analyses; Prepare Memo to File Summarizing Inspection.

In employing the three-tiered approach, priority is given to inspection of the largest dams with the greatest number of citizens at potential risk. For these dams, Water Resources Program Policy 5104 dictates comprehensive inspections are to be performed on a 6-year cycle and detailed engineering reports are prepared for transmittal to the dam owner.

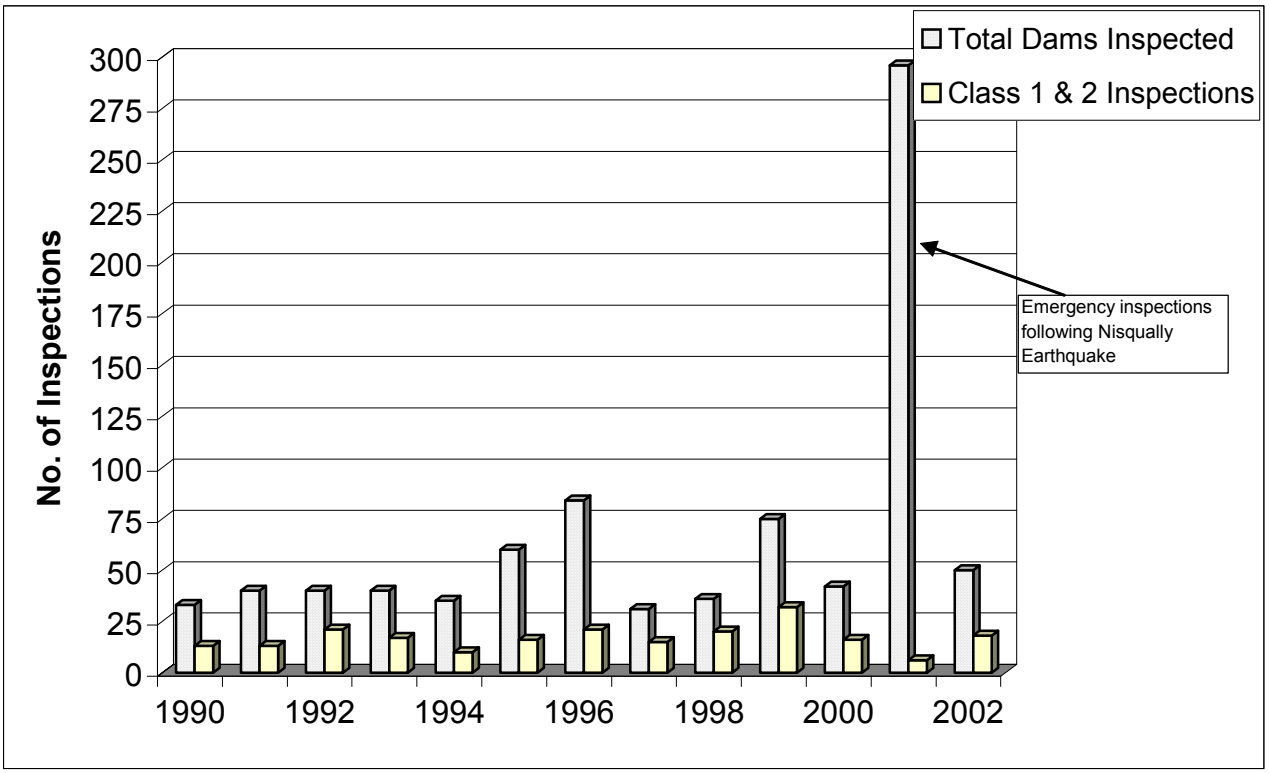
In 2001 and 2002, a total of 24 comprehensive Class I and II inspections were completed, and eight dams were added to the list of dams with deficiencies.

Reconnaissance inspections are conducted on those smaller dams where there is a moderate to low potential for loss of life in the event of a dam failure. For these dams, the primary intent is to identify any situations that pose an imminent hazard, or where population growth has occurred in the downstream floodplain. A total of 32 reconnaissance inspections were performed, primarily on Hazard 2 Dams.

As stated previously, an additional 290 emergency inspections were performed following the February 2001 Nisqually Earthquake. These inspections consisted of brief visual examinations to look for any evidence of earthquake damage. Only five dams were found to have minor damage, and no dams were at risk of failing because of the quake.

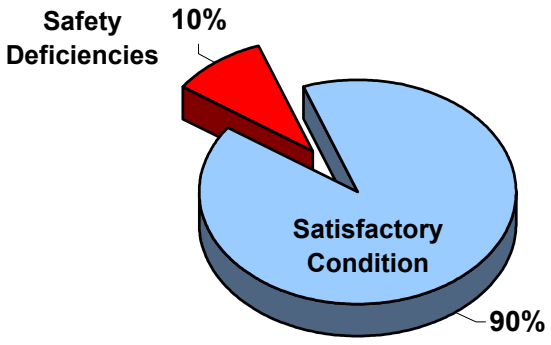
A summary of the periodic inspection activity over the last 10 years is provided in Figure B.

Figure B
Summary of Periodic Inspection Activity Since 1990



Up to this point, the report has focused on the identification of dams with deficiencies and progress in correcting those deficiencies. Figure C has been prepared to give a broader perspective of the periodic inspection program for dams situated above populated areas. It summarizes the number of dams that are in satisfactory condition relative to the number of dams with deficiencies. This chart shows that most of the dams above populated areas are in satisfactory condition, but there are still a significant number of dams that are in need of repairs.

Figure C
Condition of Dams Above Populated Areas in Washington - 2002



310 Dams
High and Significant
Hazard Potential

Remedial Activity

Progress in Repairs to Dams during 2001-2002

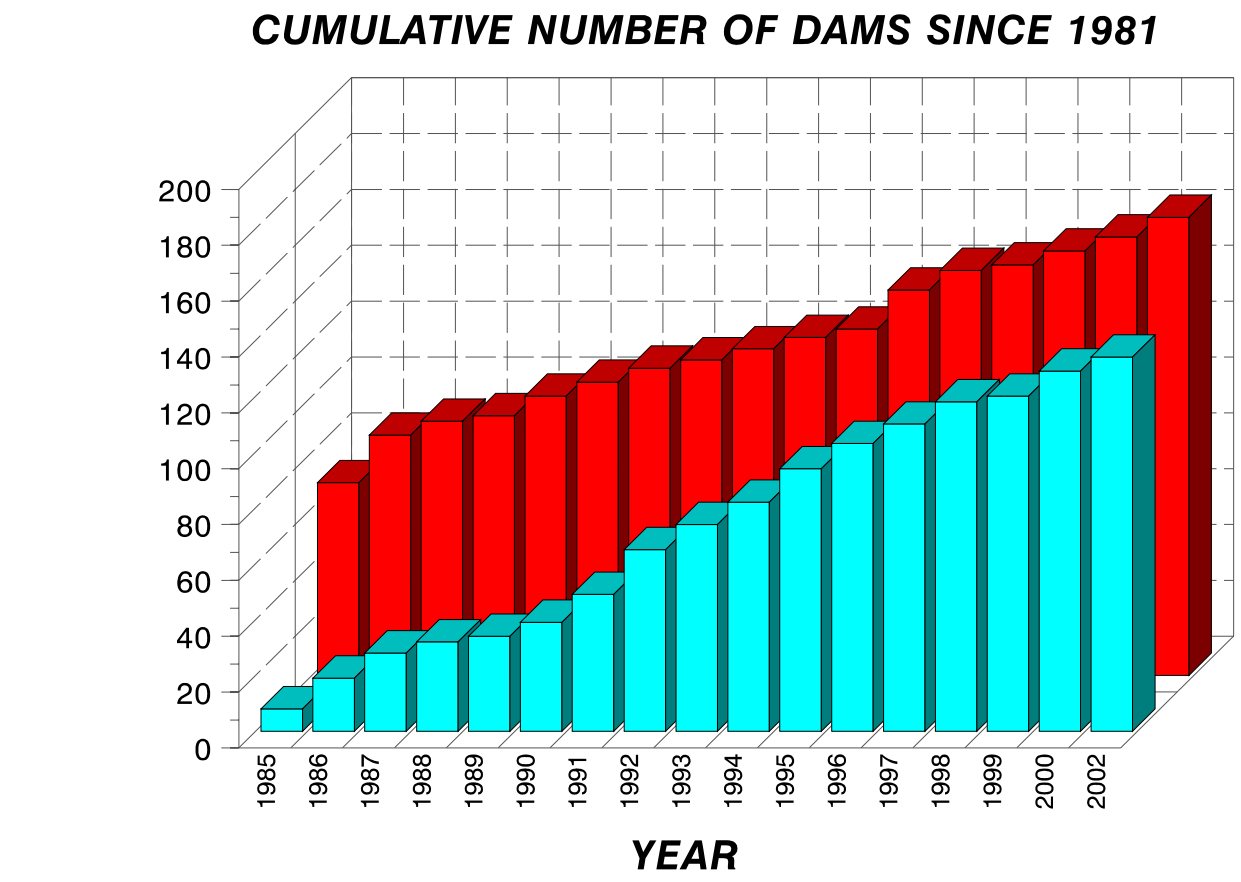
Based on inspections performed in 2001 and 2002, seven dams were added to the list of dams with safety deficiencies. Due to this increase, no progress was made in reducing the backlog of projects in need of remedial work, as only five dams were removed from the list after remedial work was completed. Partial repairs were also initiated at three dams during the past two years. Table 3 summarizes the dams where repairs were completed during 2001-2002.

Table 3
Dams Repaired or Modified in 2001-02

COUNTY	PROJECT AND DAM NAME	OWNER
CHELAN	Antilon Lake Dam	Lake Chelan Reclamation District
KING	Lake Margaret Dam	Lake Margaret Homeowners Association
KITSAP	Tahuyeh Lake Dam	Tahuyeh Lake Community Club
SKAGIT	Judy Reservoir Dam B Lang Dam No. 1	Skagit PUD No. 1 Harry Lang

Remedial work has now been completed on 134 the cumulative 165 dams that have been identified since 1981 as having safety deficiencies (Figure D). In addition, partial repairs have now been completed on five dams. As shown in Figure D, progress has stalled in closing the gap in repairing dams with safety deficiencies, because ongoing inspections are adding as many new dams with deficiencies to the list as are being removed from the list by being repaired. This is largely due to the problem of aging dams not meeting higher safety standards due to population growth but is also due to increasing seismic standards, aging of man-made materials, and lack of maintenance.

Figure D
Cumulative Summary of Corrective Action



Conclusions

There are currently 310 dams in Washington, sited above populated areas, in which Ecology is the sole regulatory agency. All of the 122 dams located upstream of three or more residences (high downstream hazard potential) have been inspected at least once and are on a 6-year inspection cycle. The first round of inspections for the 188 dams classified as having a significant downstream hazard has also been completed, and these projects on an 8-year inspection cycle. However, due to population growth below dams, changing seismic standards, a large increase in stormwater dam permitting, and the workload imposed following the Nisqually Earthquake in 2001, the Dam Safety Office has been unable to maintain these inspection frequencies. Furthermore, most state and federal dam safety agencies perform inspections on these high and significant hazard dams on no more than a 3-to5 year cycle. Instead, Ecology currently only has sufficient staff to maintain the 6-year inspection cycle on the dams with high downstream hazards, leaving the significant hazard dams to be inspected on an 8-to-10-year cycle. Funding through the National Dam Safety Program has helped somewhat toward reducing the inspection cycle on significant hazard dams, by allowing Ecology to hire an entry-level engineer. However, this funding will not help us reduce the inspection cycle on high hazard dams to meet the 3-to-5-year standard used by other dam safety agencies. This means that for many dams, aging, deterioration and maintenance problems will have more time to develop between inspections, possibly threatening the safety of the dams and threatening public safety. In addition, development will continue to occur downstream of these dams, placing more citizens at risk from dam failure.

For the first time in many years, more projects were added to the list of dams with deficiencies in 2001-02 than were removed by being repaired. The cause of this is twofold. First, fewer dams were repaired because for many of the dams remaining on the list, funding for repairs is not readily available. Second, more dams are being added to the list following inspections by the DSO due to older dams not meeting higher safety standards because of population growth, increasing seismic standards, aging of manmade materials, and lack of maintenance. It is anticipated that unless state funding becomes available for repairing and maintaining existing infrastructure, the gap between dams with deficiencies and those that have been repaired will continue to widen.

To date, safety deficiencies have now been identified on a cumulative 165 dams, and actions to correct deficiencies are summarized below.

- Deficiencies have been corrected ..... 134 dams.
- Partial repairs have been completed..... 5 dams.
- Engineering studies and/or design work is underway..... 9 dams.

The number of dams where owners have been unresponsive increased in 2002 from 8 to 10 projects. This change was due to the difficulties many owners are having obtaining funding for repairs. The remaining eight projects are still on a prioritized schedule for compliance. Should an owner continue to be

unresponsive, the department may issue regulatory orders and/or penalties. If an emergency situation exists, Ecology may physically reduce the hazard and charge the owner for costs incurred.

In 2001 and 2002, through FEMA, Ecology received state funding assistance of about $46,000, under the National Dam Safety Act of 1996. This funding provided about 50% of the cost of an entry-level engineer, who primarily worked on inspecting significant hazard dams. With the reauthorization of the Dam Safety and Security Act of 2002, it is anticipated that Ecology will receive an additional $70,000 a year over the next four years from FEMA, which will allow us to continue employing this engineer. The funding will allow the dam safety office to work toward reducing the inspection cycle on significant hazard dams. Gov. Locke's 2003-05 budget proposes an additional staff person beginning in FY 2005, depending on whether or not fees can be increased for plan reviews and new inspection fees put in place. If both measures are implemented, Ecology ought to be able to achieve a 5-year inspection cycle for dams with downstream populations at risk within a few years.

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Appendix A - Project Status

The status of the remaining projects with uncorrected deficiencies as identified during the Ecology inspections prior to 1999 is provided in Table I. The dams identified as having deficiencies in 1999 and 2000 are shown in Table II.

Within these tables, individual projects are listed by county location and project name in alphabetical order. The dam identification numbers are also provided as listed in the state inventory of dams. Project owners are listed next, followed by a brief description of the identified major safety deficiencies. The status of activity, reflecting, in part, the owners' attitude to make the needed repairs or modifications, is indicated by the following letter codes.

C - Deficiencies corrected

I - Some deficiencies corrected-necessary modification incomplete

S - Action started but currently not progressing

P - Action started and studies and/or work progressing satisfactorily

A - Informal enforcement action initiated (i.e., advisory/warning letter)

R - Formal enforcement action initiated (i.e., regulatory order issued)

N - No response or progress

L - Regulatory order appealed to Pollution Control Hearings Board or in litigation

The final columns in the tables provide information on rehabilitation or modification costs. Where no detailed engineering assessment was available, an estimated cost range was provided based on an assumed range of probable options that may come under consideration. These figures are shown to indicate the relative order of magnitude of the problem and, necessarily, cannot be assumed to be highly reliable.

Projects where remedial work was completed in years prior to 1998 have been removed from this report. For a listing of these projects, please refer to the 1996 Report to the Legislature.

TABLE I

PROJECT REHABILITATION STATUS SUMMARY OVER LAST 3 YEARS
(DAMS INSPECTED PRIOR TO 2001)

County I.D. No.	Project Name	Owner	Safety Deficiencies	Status/Attitude			Estimated Repair Cost	Repairs Completed	Population at Risk
				2000	2001	2002	$ Thousands		
CHELAN									
81	Antilon Lake Dam	Lake Chelan Reclamation Dist.	Seismic Stability,High Lake Level	A,P,I	C	C	10	Complete	2-5
77	Mathison Dam	Thomas K. Mathison & Ralph Hedges	Embankment stability,seepage	S	S	S	10-30	None	2-5
235, 412	Wenatchee Heights Dam No. 1 & Saddle Dam	Wenatchee Heights Reclamation District	Embankment Stability, Seepage	S,A	S,A	P,A	10-70	None	1-5
FERRY									
622	Grouden Dam	U.S. Forest Service	Inadequate Spillway Capacity	p	S	A,P	100-200	None	6-12
GRAYS HARBOR									
663	College Hill Reservoir	City of Hoquiam	Seismic Stability Issues	A,P	S	S	50-100	None	50-100
KING									
236	Lake Margaret Dam	Lake Margaret Community Purposes Club	Inadequate Spillway Capacity	P	P	C	50	Complete	15-20
KITSAP									
188	Tahuya Lake Dam	Lake Tahuyeh Community Club	Inadequate Spillway Capacity	P	C	C	100	Complete	60+
KLICKITAT									
446	Johnson Creek Res.	Jim Meduna	Spillway Erosion	P	A,P	S	20-30	None	1-3
MASON									
89	Timberlakes Dam	Timberlakes Homeowners	Outlet Conduit Deterioration	S	P	P	60	None	1-6
OKANOGAN									
40	Fanchers Dam	Cascade Ranches, Inc. Olma Brothers Corp.	Inadequate Spillway Capacity Embankment Stability,Seepage	S,I	P,I	P,I	30-70	Partial	15-20
329	Beth Lake Dam	USDA National Forest	Inadequate Spillway Capacity	S	S	P	20-40	None	6-10

C = Deficiencies Corrected; I = Some deficiencies corrected, but incomplete; S = Action started but currently not progressing; P = Progressing satisfactorily

A = Informal enforcement action; R = Regulatory Order issued; N = No response or progress; L = Litigation; F = Inadequate funding for repairs by owner

TABLE I (continued)

County I.D. No.	Project Name	Owner	Safety Deficiencies	Status/Attitude			Estimated Repair Cost	Repairs Completed	Population at Risk
				2000	2001	2002	$ Thousands		
PACIFIC									
522	Indian Creek Dam	City of Ilwaco	Inadequate Spillway Capacity	P,I	P,I	P,I	20	Partial	1-3
PEND OREILLE									
1123	Cedar Creek Reservoir Dam	Town of Ione	Cracking and Deterioration of Concrete, Structural Stability, Spillway Adequacy	S	S	R,P	50-150	None	10
SAN JUAN									
444	Roache Harbor Dam	Roache Harbor Water Co.	Inadequate Spillway Capacity	P	P	P	100	None	3-10
SKAGIT									
382, 383, 384	Cultus Mountain Dams A, B and C	Evergreen Council, Boy Scouts of America	Spillway Rehabilitation, Seismic Stability	P	S	S	10-70	None	3-10
183	Judy Reservoir Dam B	Skagit County PUD No.1	Inadequate Spillway Capacity Conduit Leakage	P,I	C	C	9,000	Complete	30-50
1160	Lang Dam No. 1	Harry Lang	Inadequate spillway capacity embankment stability,seepage	N	N	C	5-10	Complete*	0
141	Nookachamps Hills Dam	MV Associates	Inadequate spillway capacity embankment stability	S,I	S,I	S,I	30-50	Partial	3-6
SKAMANIA									
89	Trout Creek(Hemlock) Dam	U.S. Forest Service	Structural Stability During Floods	P	P	P	100	None	300+
SPOKANE									
50	Reflection Lake South Dam	Reflection Lake Homeowners Assoc.	Inadequate Spillway Support Maintenance Deficiencies	A,P	S	S	250	None	8-12
STEVENS									
1308	Blue Gulch Reservoir	Richard Hurst	Barrier Stability, Inadequate Spillway	P,I	S,I	S,I	20	Partial	1-3
WHATCOM									
522,1204	Holiday & Swim Lake Dams	Lummi Island Estates Homeowners Assoc.	Seepage & Piping Concerns Inadequate Spillway	A,P	P	P	30-80	None	1-3
YAKIMA									
1809	Berghoff Dam	Dwight Berghoff	Inadequate Spillway Capacity	P,I	P,I	P,I	20-30	Partial	1-3
1010	Stevenson Dam	Robert White	Inadequate Spillway Capacity	A,P	S	S	20-50	None	3-6

C = Deficiencies Corrected; I = Some deficiencies corrected, but incomplete; S = Action started but currently not progressing; P = Progressing satisfactorily

A = Informal enforcement action; R = Regulatory Order issued; N = No response or progress; L = Litigation; F = Inadequate funding for repairs by owner

TABLE II
PROJECT REHABILITATION STATUS SUMMARY
(DAMS INSPECTED BY DAM SAFETY SECTION IN 2001 & 2002 AND FOUND TO HAVE DEFICIENCIES)

County I.D. No.	Project Name	Owner	Safety Deficiencies	Status/Attitude 2002	Estimated Repair Cost $ Thousands	Repairs Completed	Population at Risk
CHELAN							
72	Meadow Lake Dam	Galler Ditch Company	Inadequate Spillway	A,P	20	None	7-15
KING							
194	Welcome Lake Dam	Lake of the Woods Homeowners Assoc.	Inadequate Spillway Capacity	A,P	10-15	None	50-100
683	ICON Materials Sedimentation Dam	ICON Materials, Inc.	Illegal Construction, Unknown Embankment Stability	A,P	50-100	None	10-30
OKANOGAN							
662	Aspen Lake Dam	Wash. State Dept. of Fish and Wildlife	Inadequate Spillway, Embankment Stability	A,P	100	None	1-3
SNOHOMISH							
1521,1522	Neilson Dams B & C	Wayne Neilso	Inadequate Spillway Capacity	A,P	10	None	7-10
STEVENS							
64	Beitey Lake Dan	Gerald Beitey	Inadequate Spillway Capacity	A,P	50-100	None	10-20
60	Serenity Lake Dam	Long Wood LLC	Inadequate Spillway Capacity	A,P	30-50	None	10-30

C = Deficiencies corrected; I = Some deficiencies corrected, but incomplete; S = Action started but currently not progressing; P = Progressing satisfactorily A = Informal enforcement action; R = Regulatory Order issued; N = No response or progress; L = Litigation; F = Inadequate Funding for repairs by owner